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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/894,310	06/27/2001	Richard L. Coulson	42390P11448	7622

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EXAMINER

INOA, MIDYS

ART UNIT	PAPER NUMBER
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2188

DATE MAILED: 04/30/2004

15

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/894,310

Applicant(s)

COULSON ET AL.

Examiner

Midys Inoa

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 02 April 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-41 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-41 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 27 July 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>13</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Comments

1. Examiner acknowledges the receipt of multiple declarations on April 4th, 2004 which state that the invention in question was conceived as early as December 20th, 2000

Information Disclosure Statement

2. The information disclosure statement (IDS) submitted on April 2nd, 2004 has been considered by the examiner.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1-41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Green (6,044,478) in view of Bierma et al. (5,758,149).

Regarding Claims 1, 30-31, 33-35, and 41, Green discloses a method comprising storing data needed by a system's time critical instruction in a cache memory of the system (see Figure 5, 204, Column 2, lines 3-21); and pinning (locking) at least a portions of the data stored in the cache memory (Column 2, line 46 to Column 3. line 17), wherein the pinning is performed during the initial execution of the time critical instruction. Green does not teach the cache memory being a non-volatile memory. Additionally, Green does not specifically identify the data being stored and pinned as initialization data. However, it is noted that initialization is in fact a type of time critical instruction. Bierma et al. teaches issuing a "Lock File" command to a

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Non-volatile cache 102 (see Figure 35 and Column 26, lines 54-63). It would have been obvious to one of ordinary skill in the art at the time the invention was made to use a non-volatile cache in the system of Green since this modification would allow the system to pin data needed by the system at all times and ensure that this data, pinned prior to a system shutdown, will still be readily available (since it is in a cache) once the system starts up again. Additionally, it would have been obvious to one of ordinary skill in the art at the time the invention was made to lock initialization data in the non-volatile cache since this data is always needed by the system and locking it in the cache would make it more readily accessible each time the system has to initialize, thus speeding up the initialization process (see Definitions for *ini file* and *boot data* for further support).

Regarding Claim 2, Bierma et al. teaches using a non-volatile cache memory.

Regarding Claim 3, Green discloses storing and pinning data needed by a system's time critical instruction in a cache memory (see Figure 5, 204, Column 2, lines 3-21); where the system's time critical instruction could be system initialization and the data needed is initialization data.

Regarding Claims 4, 36, and 38, Green discloses a system wherein pinning comprises storing metadata ("MESI valid states stored in cache tag 224" Column 16, lines 23-40) corresponding to the data stored in the non-volatile cache memory; and setting a state in the metadata to indicate the a corresponding line of data is pinned (locked-valid and locked-invalid states" Column 3, lines 1-17).

Regarding Claim 7, Green discloses a system comprising a state to indicate least recently used information of a corresponding line of data in a cache memory of the system (Figure 7,

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cache usage logic 213); and a second state to indicate whether a corresponding line of data in the cache memory is pinned (Figure 7, lock status indicator 215 and Figure 5, 224; Column 15, lines 42-55).

Regarding Claim 8, Green discloses data states being stored in the cache tag where one of such states could indicate the data's age and thus indicate if the data was present before system initialization.

Regarding Claim 9, Green discloses storing and pinning data needed by a system's time critical instruction in a cache memory (see Figure 5, 204, Column 2, lines 3-21); where the system's time critical instruction could be system initialization and the data needed is initialization data. Additionally, Green discloses storing the MESI and valid states in a secondary cache tag (second memory), which could be volatile.

Regarding Claims 10-11, Green discloses a system comprising a cache including a first storage media (204) to store cache data and a second storage media (224) to store metadata for the cache data stored in the first storage media, the metadata including a state to indicate whether a corresponding line of data is pinned (Figure 7, 215 and Figure 5, 204 and 224; Column 15, lines 42-55). Green does not teach the cache memory being a non-volatile memory and he does not specifically identify the data being stored and pinned as initialization data. Bierma et al. teaches issuing a "Lock File" command to a Non-volatile cache 102 (see Figure 35 and Column 26, lines 54-63). It would have been obvious to one of ordinary skill in the art at the time the invention was made to use a non-volatile cache in the system of Green since this modification would allow the system to pin data needed by the system at all times and ensure that this data, pinned prior to a system shutdown, will still be readily available (since it is in a cache) once the

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system starts up again. Additionally, it would have been obvious to one of ordinary skill in the art at the time the invention was made to lock initialization data in the non-volatile cache since this data is always needed by the system and locking it in the cache would make it more readily accessible each time the system has to initialize, thus speeding up the initialization process (see Definitions for *ini file* and *boot data* for further support).

Regarding Claims 5-6, 12-13, and 39-40 Green discloses storing the MESI and valid states in a secondary cache tag (224, second memory) located within the cache 204, which could be volatile (Figure 5).

Regarding Claim 14, it would have been obvious to one of ordinary skill in the art at the time the invention was made to implement the cache of Green as an add in card since such cards (Flash memories) are very easy to integrate to a system when additional memory is needed.

Regarding Claims 15-16, Green discloses a method comprising accessing a first memory, the first memory being a cache; and pinning (locking) data in the first memory (Column 2, lines 3-20 and Column 3, lines 1- 17). Green does not teach the cache memory being a non-volatile memory and he does not specifically identify the data being stored and pinned as initialization data. Bierma et al. teaches issuing a "Lock File" command to a Non-volatile cache 102 (see Figure 35 and Column 26, lines 54-63). It would have been obvious to one of ordinary skill in the art at the time the invention was made to use a non-volatile cache in the system of Green since this modification would allow the system to pin data needed by the system at all times and ensure that this data, pinned prior to a system shutdown, will still be readily available (since it is in a cache) once the system starts up again. Additionally, it would have been obvious to one of ordinary skill in the art at the time the invention was made to lock initialization data in the non-

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volatile cache since this data is always needed by the system and locking it in the cache would make it more readily accessible each time the system has to initialize, thus speeding up the initialization process (see Definitions for *ini file* and *boot data* for further support).

Regarding Claim 18, Green discloses the method where pinning comprises storing metadata for the data stored in the first memory, the metadata including a first state to indicate whether a corresponding line of data is pinned; and setting a first state corresponding to the accessed data to indicate the accessed data is pinned (Figure 7, lock status indicator 215 and Figure 5, 224; Column 15, lines 42-55).

Regarding Claim 19, it is understood that the system must have a way of determining when the data needed for system initialization is no longer need and therefore, should no longer be locked.

Regarding Claim 17, 20, 32, and 37, if the data being pinned is that which is needed for system initialization, in pinning this data only, the pinning of data is being limited.

Regarding Claim 21-22, Green discloses data states being stored in the cache tag where one of such states could indicate the data's age and thus indicate if the data was present before system initialization. Additionally, it is understood that the system must have a way of determining when the data needed for system initialization is no longer need and therefore, should no longer be locked. This can be done by way of a timer. Furthermore, if the data being pinned is that which is needed for system initialization, in pinning this data only, the pinning of data is being limited to a maximum amount. Being that the system has the parameters of a maximum amount of data and a timer, it would have been obvious to set an invalid state within

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the metadata to indicate if the parameters have or have not been met. Additionally, if the data is marked invalid, then marking it for locking is avoided.

Regarding Claims 23 and 25, Green discloses a system comprising a cache including a first storage media 205, a second storage media 224 to store metadata for data in the cache, the metadata including a first state; and a memory control hub (Processor figure 2) to cause the first state to be set for data in the cache, the setting of the first state to indicate the a corresponding line of data is pinned (Figure 7, lock status indicator 215 and Figure 5, 224; Column 15, lines 42-55). Green does not teach the cache memory being a non-volatile memory and he does not specifically identify the data being stored and pinned as initialization data. Bierma et al. teaches issuing a "Lock File" command to a Non-volatile cache 102 (see Figure 35 and Column 26, lines 54-63). It would have been obvious to one of ordinary skill in the art at the time the invention was made to use a non-volatile cache in the system of Green since this modification would allow the system to pin data needed by the system at all times and ensure that this data, pinned prior to a system shutdown, will still be readily available (since it is in a cache) once the system starts up again. Additionally, it would have been obvious to one of ordinary skill in the art at the time the invention was made to lock initialization data in the non-volatile cache since this data is always needed by the system and locking it in the cache would make it more readily accessible each time the system has to initialize, thus speeding up the initialization process (see Definitions for *ini file* and *boot data* for further support).

Regarding Claim 24, Green discloses data states being stored in the cache tag where one of such states could indicate the data's age and thus indicate if the data was present before system initialization.

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Regarding Claim 26, if the data being pinned is that which is needed for system initialization, in pinning this data only, the pinning of data is being limited.

Regarding Claim 27-28, Green discloses cache tag 224, which is a volatile media and it is located within cache 204 (Figure 5).

Regarding Claim 29, it would have been obvious to one of ordinary skill in the art at the time the invention was made to implement the cache of Green as an add in card since such cards (Flash memories) are very easy to integrate to a system when additional memory is needed.

Response to Arguments

5. Applicant's arguments with respect to claims 1-36 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Midys Inoa whose telephone number is (703) 305-7850. The examiner can normally be reached on M-F 7:00am - 4:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mano Padmanabhan can be reached on (703) 306-2903. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Midys Inoa
Examiner
Art Unit 2188

MI



GARY PORTER
PRIMARY EXAMINER